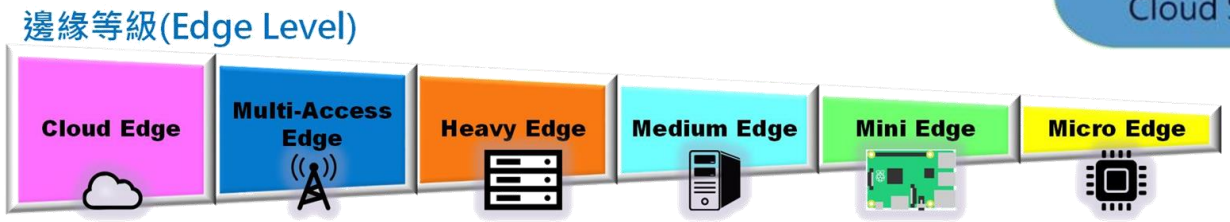
國立臺灣科技大學
NATIONAL TAIWAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Department of Computer Science & Information Engineering
資 訊 工 程 系

人工智慧與邊緣運算實務

0C Intel DevCloud 安裝與測試



資訊工程系　許哲豪 助理教授

簡報大綱

- Intel DevCloud簡介
  - 帳號申請
  - 支援硬體
  - 系統架構
  - 工作環境
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    - 工作流程
    - 執行結果比較
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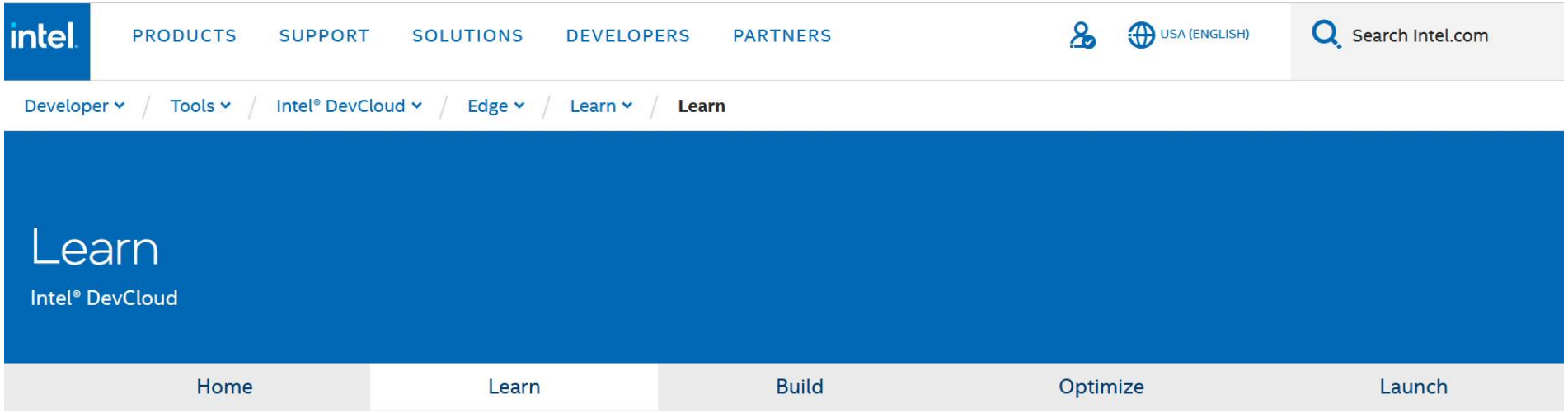
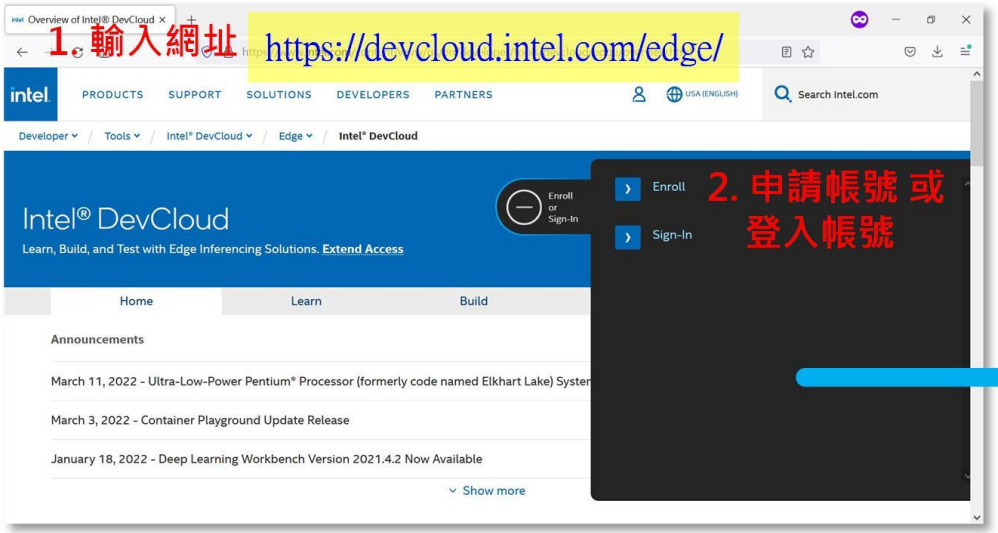
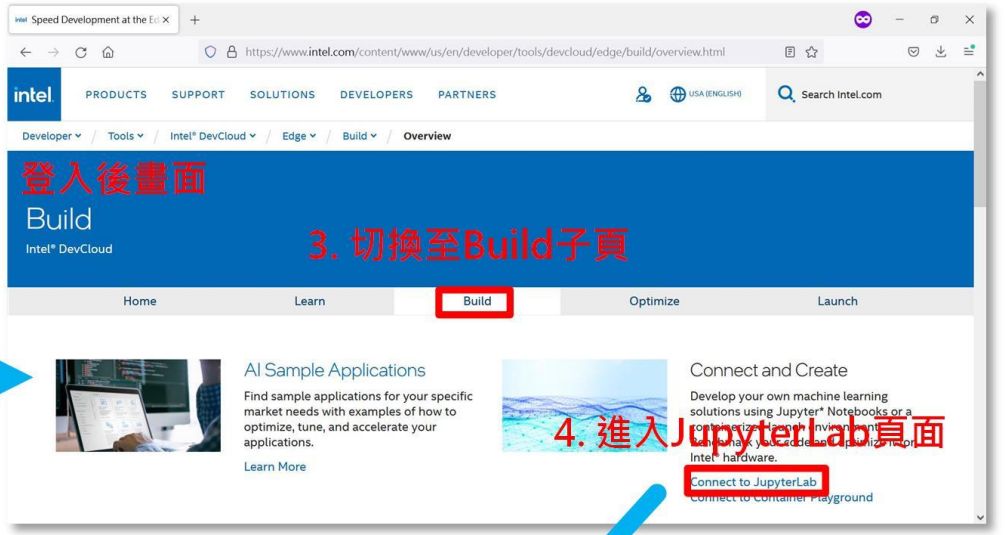
Intel DevCloud簡介



Intel OpenVINO雲端測試服務 https://devcloud.intel.com/edge/

Intel DevCloud帳號申請及進入

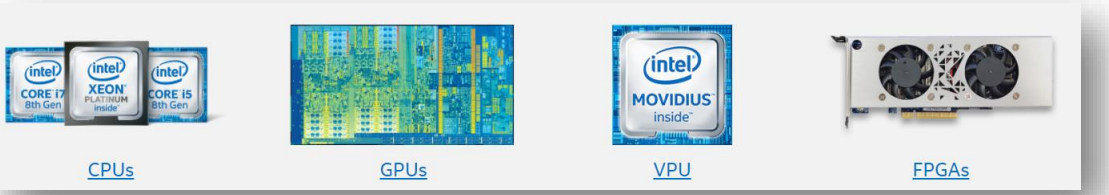




* JupyterLab
* Container Playground

Intel OpenVINO雲端測試服務 https://devcloud.intel.com/edge/

Intel DevCloud支援硬體清單

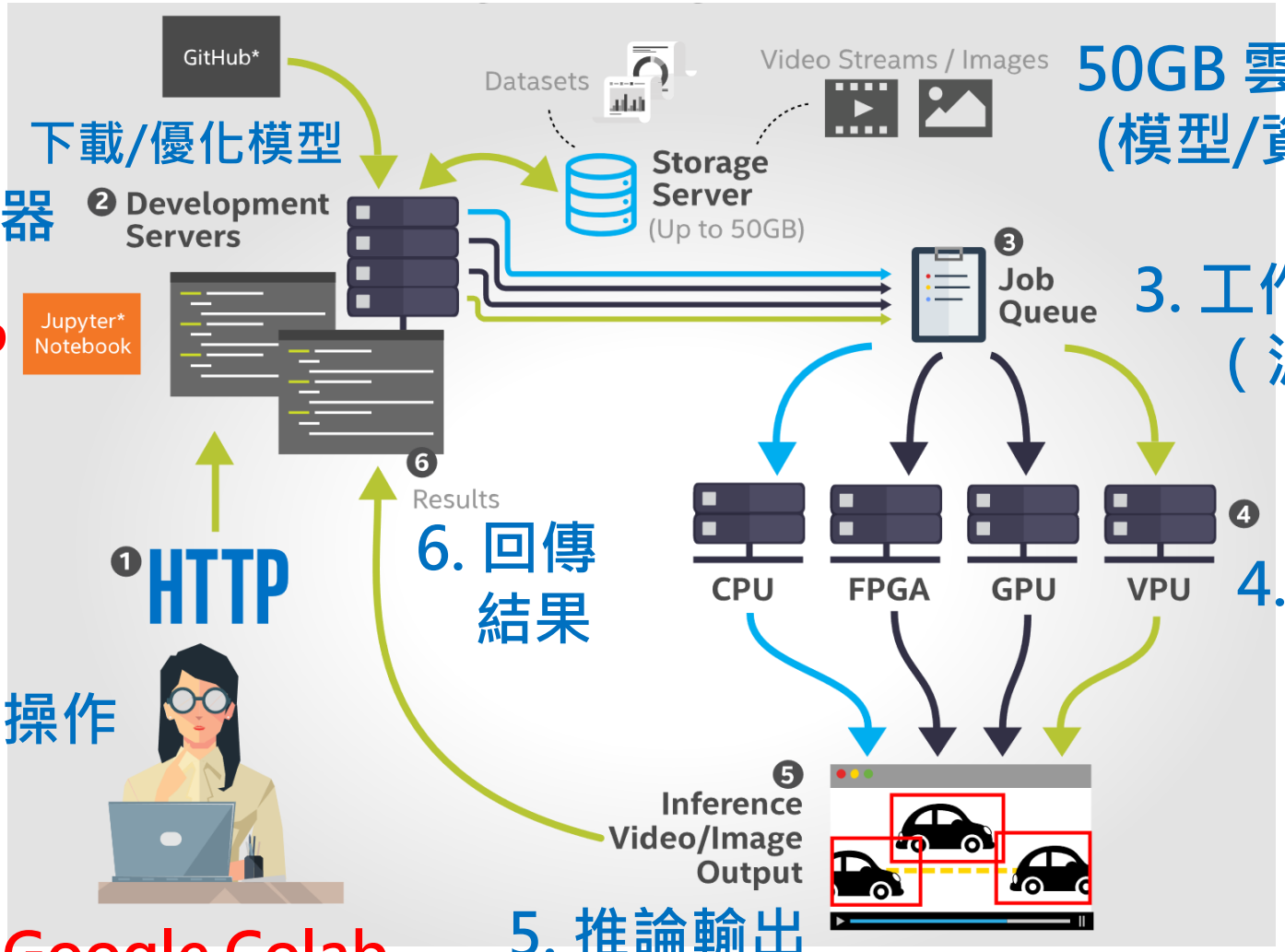


Processor	Processor Family	RAM	Integrated GPU	Inference Accelerator	Queue Label	Group ID
Intel® Core™ i5-6442EQ Processor	Skylake	8 GB	Intel® HD Graphics Driver 530	None	idc011ark2250s compnode advantech intel-core i5-6442eq skylake intel-hd-530 ram8gb net1gbe	idc011ark2250s
Intel Core i5 6500TE Processor	Skylake	8 GB	Intel HD Graphics Driver 530			
		8 GB	Intel HD Graphics Driver 530			
		8 GB	Intel HD Graphics Driver 530			
Intel Xeon Gold processor 6338N	Ice Lake-SP	128 GB	None	None	idc052 compnode smci intel-xeon 6338n ice-lake ram128gb net1gbe	idc052
Intel Core i7-1185G7E Processor	Tiger Lake	16 GB	Intel® Iris® X^E graphics	None	idc045 compnode openvino-latest intel-core i7-1185g7e iris xe graphics ram16gb tiger lake	idc045
Intel Core i5-1145G7E Processor	Tiger Lake	16 GB	Intel Iris X^E graphics	None	idc046 compnode openvino-latest intel-core i5-1145g7e iris xe graphics ram16gb tiger lake	idc045
Pentium® Processor J6426	Elkhart Lake	4 GB	Intel UHD Graphics 530	None	idc070,compnode,openvino-latest,intel-pentium,j6426,intel-uhd-10th-gen,ram4gb,none	idc070
Intel Atom® x6425RE Processor	Elkhart Lake	16 GB	Intel UHD Graphics 530	Done	idc071,compnode,openvino-latest,intel-atom,x6425re,intel-uhd-10th-gen,ram16gb,none	idc071

Group ID

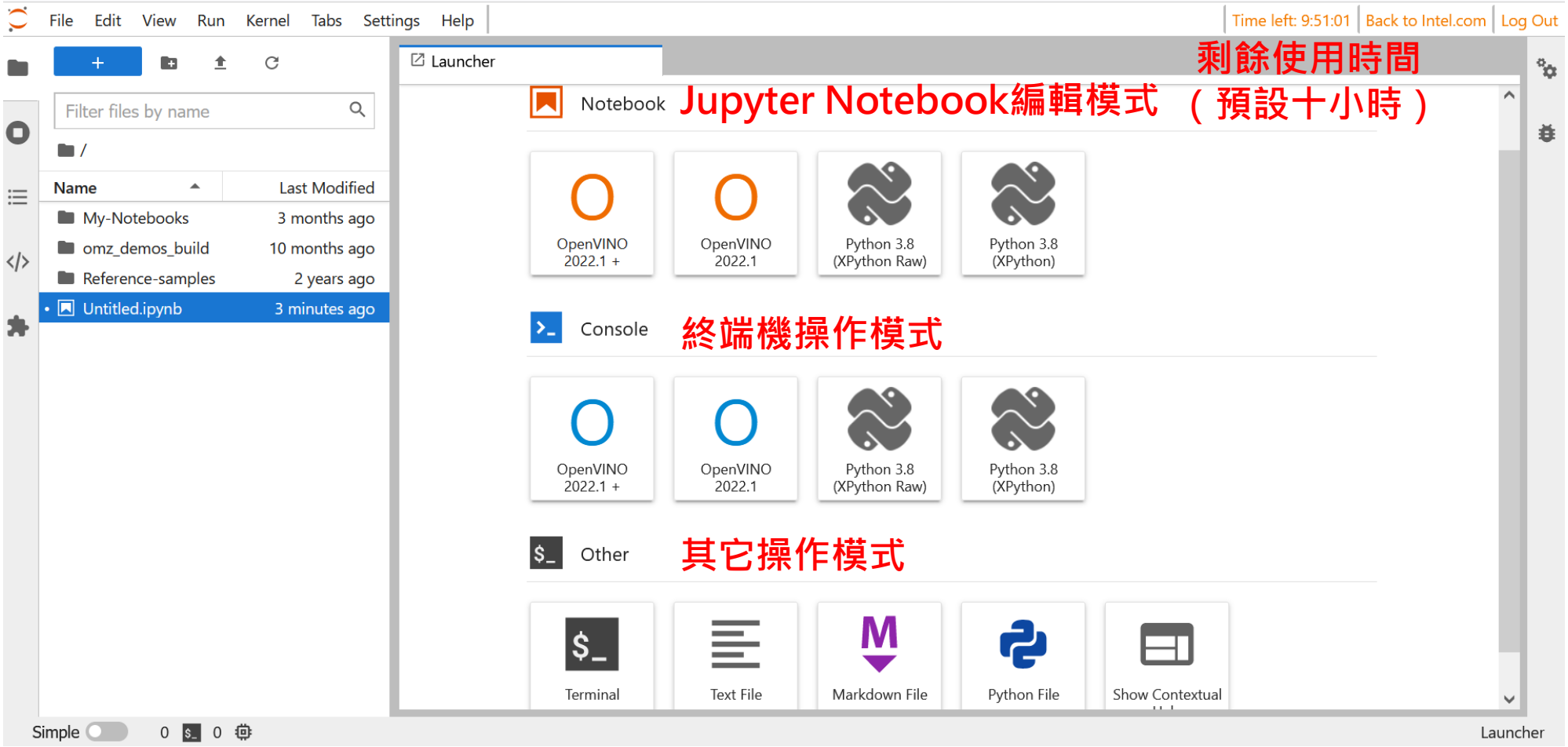
資料來源： https://www.intel.com/content/www/us/en/secure/developer/devcloud/edge/run-your-code.html

Intel DevCloud系統架構



* Intel版的Google Colab

DevCloud JupyterLab工作環境

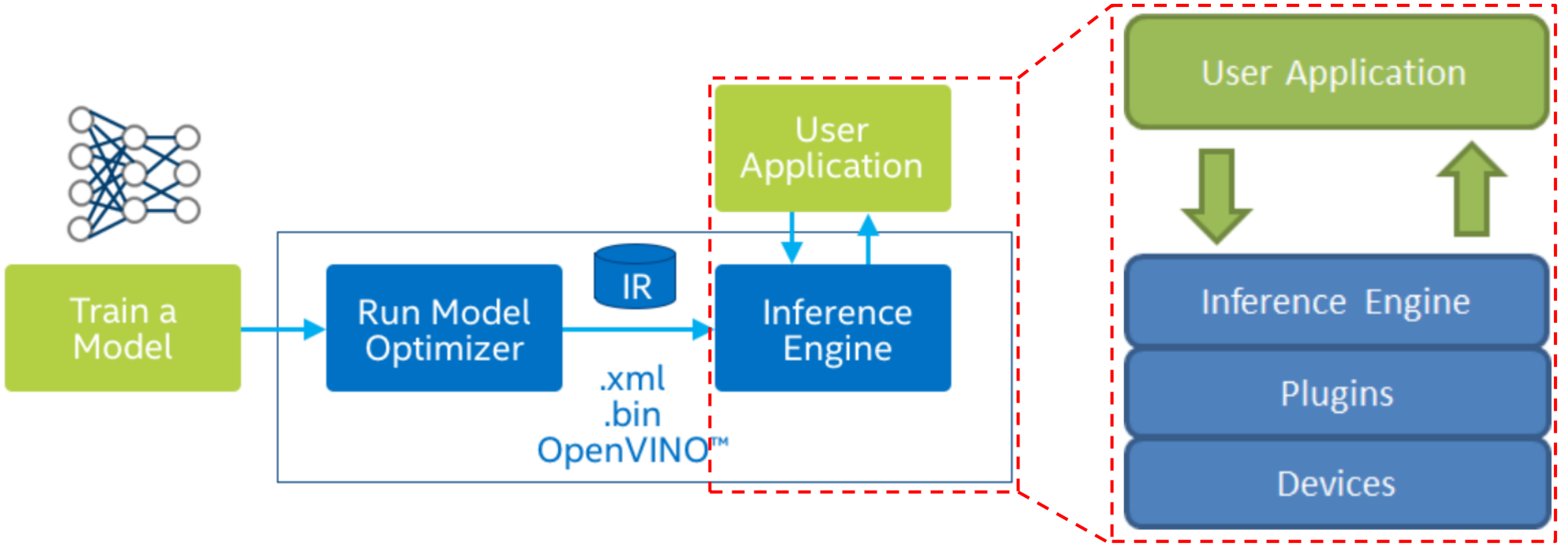


DevCloud預設執行環境

- CPU
  - Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz
- Ubuntu 18.04.6 (LTS)
- Jupyter Notebook
- OpenVINO
  - 2022.1
  - 2022.1 + TF 1.15.1
- Python 3.6.9

- Python預安裝項目
  - numpy 1.18.5
  - onnx 1.10.2
  - opencv-python 4.5.4
  - pip 21.3.1
  - tensorboard 1.15.0
  - tensorflow 1.15.5
  - torch 1.4.0
  - torchvision 0.5.0
- 其它預安裝套件可以使用 pip list 查詢

OpenVINO推論引擎架構



基本說明及影像分類範例

Learn / Get Started / Tutorials

Tutorials

Access tutorials to get you started with Intel® DevCloud, and get your deep-learning models and AI applications ready for deployment.

Learn More

指定單一硬體執行
影像分類範例

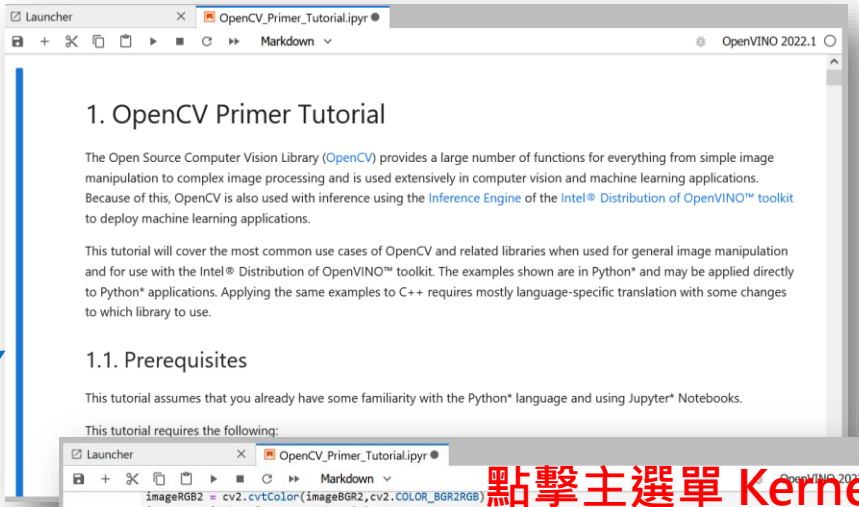
Classification

ID: 679025

Date: 09/29/21

Classify and report the probability of objects from image and video input with a SqueezeNet 1.1 model and the Intel® Distribution...

啟動範例程式

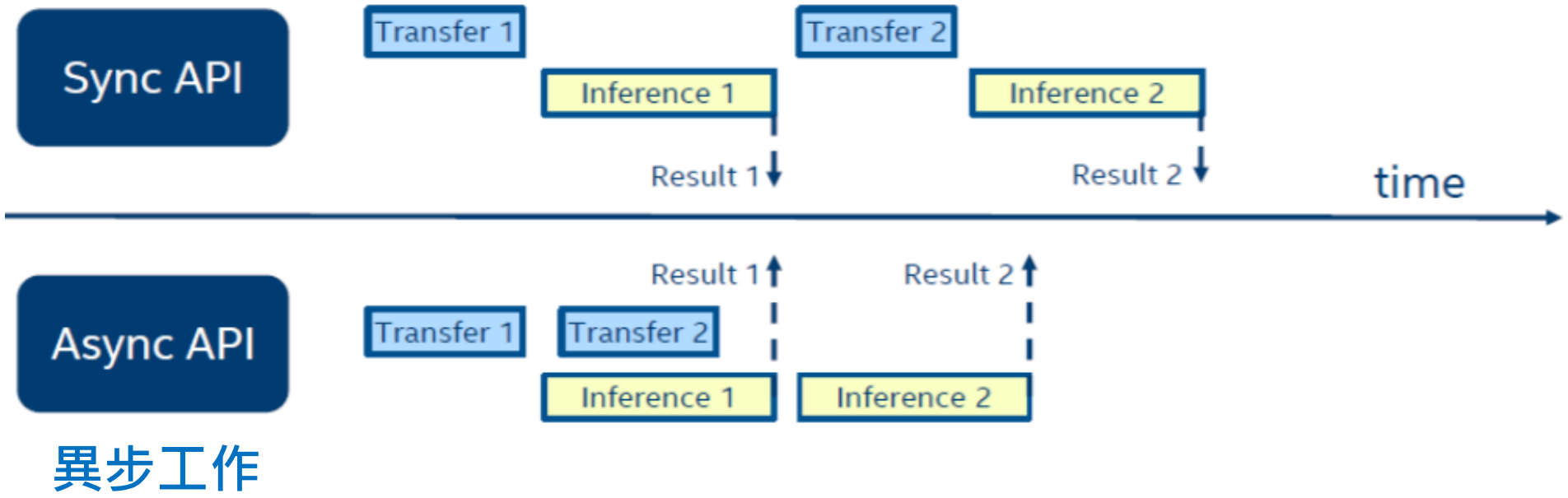


點擊主選單 Kernel / Restart Kernel and Run All Cells...

執行結果

異步工作加速原理

同步工作



異步工作

工作排程指令

- 多工批次
  - nodes=x:ppn=y (x, y為節點及節點運算單元數量)
- 工作派送
  - qsub
  - 成功回傳ID
- 查看狀態 / 取消作業
  - qstat / qdel
- 檢查所有支援硬體資訊及數量
  - !pbsnodes | grep compnode | awk '{print $3}' | sort | uniq -c

異步執行物件偵測及效能分析

Build / AI Sample Applications

AI Sample Applications

Find sample applications for your specific market needs with examples of how to optimize, tune, and accelerate your applications.

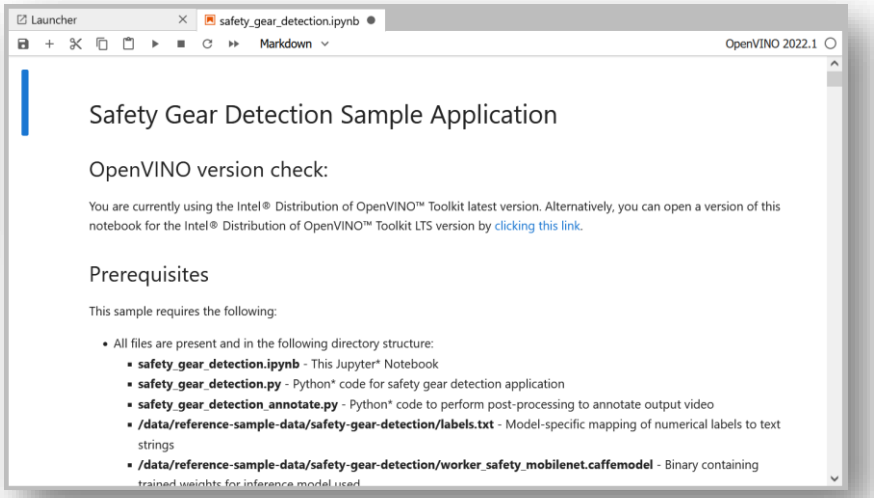
Learn More

指定多種硬體
同步執行
物件偵測範例

Safety Gear Detection

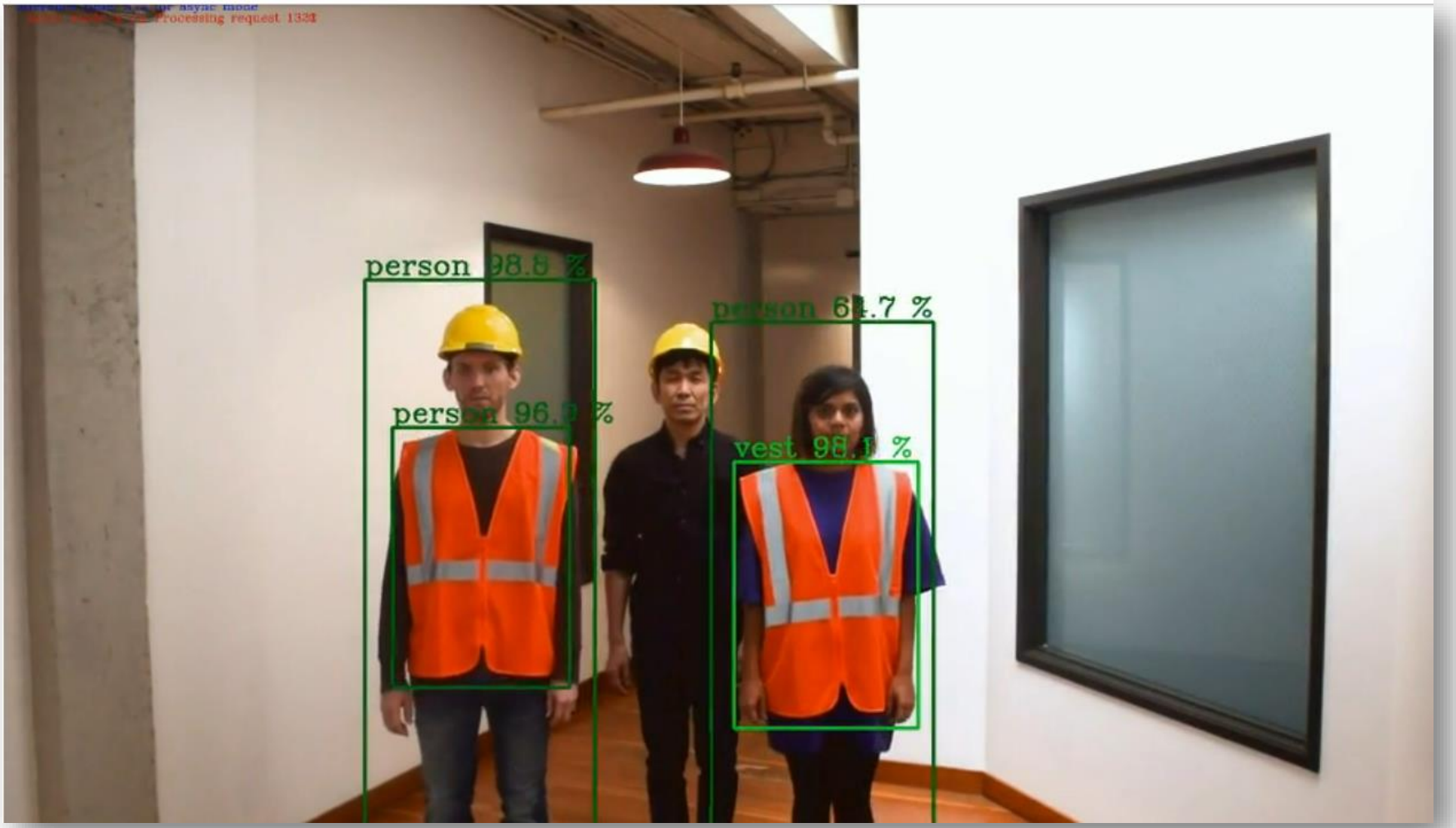
Detect people and their safety gear from video input that uses an optimized, pretrained MobileNet* single-shot detector (SSD) neural network.

safety_gear_detection.ipynb

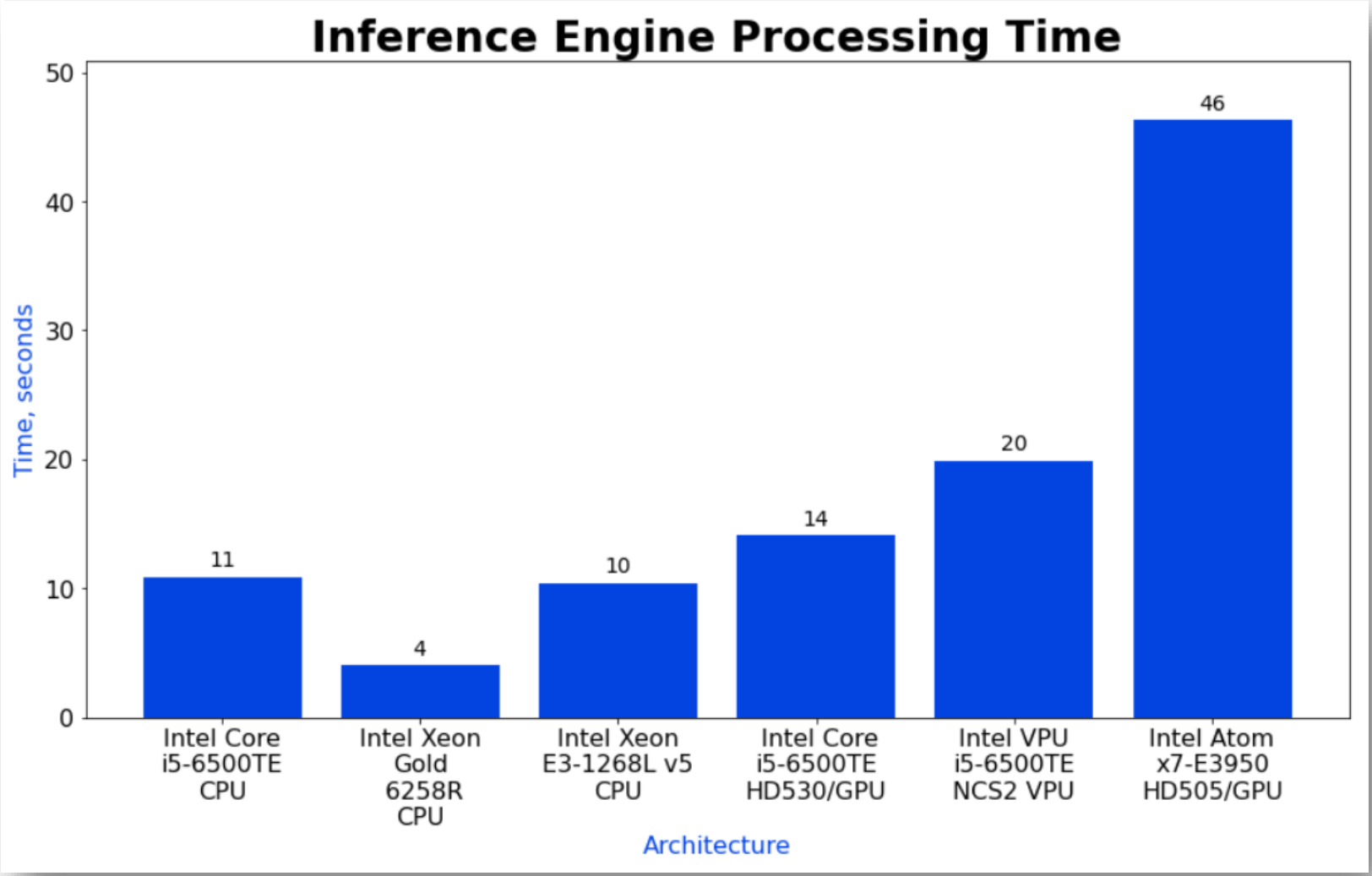


將游標移至 liveQstat()
點擊主選單 Kernel / Restart Kernel and Run up to Selected Cell ...
等待所有指定硬體都推論完

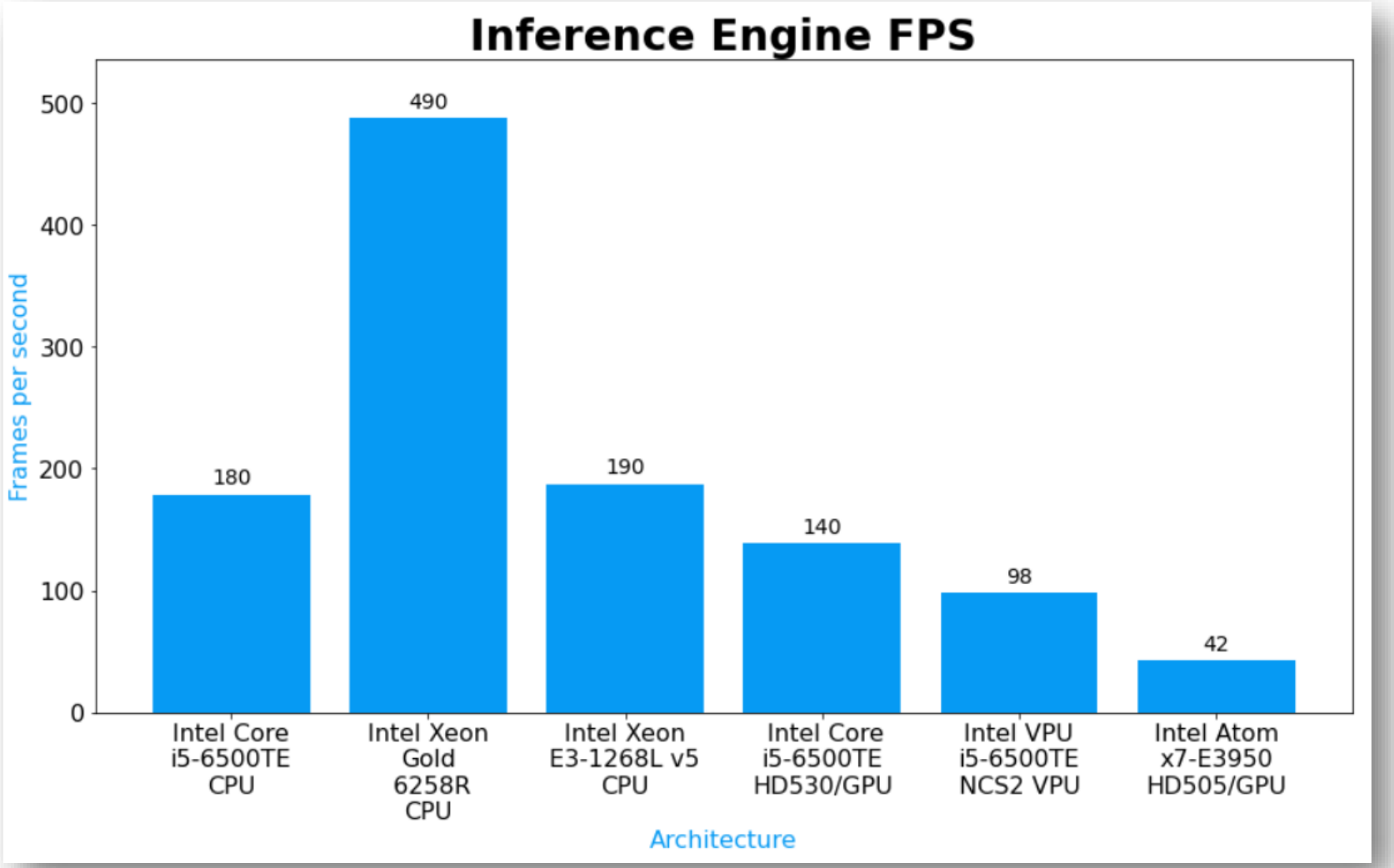
物件偵測結果



物件偵測結果比較(Time)

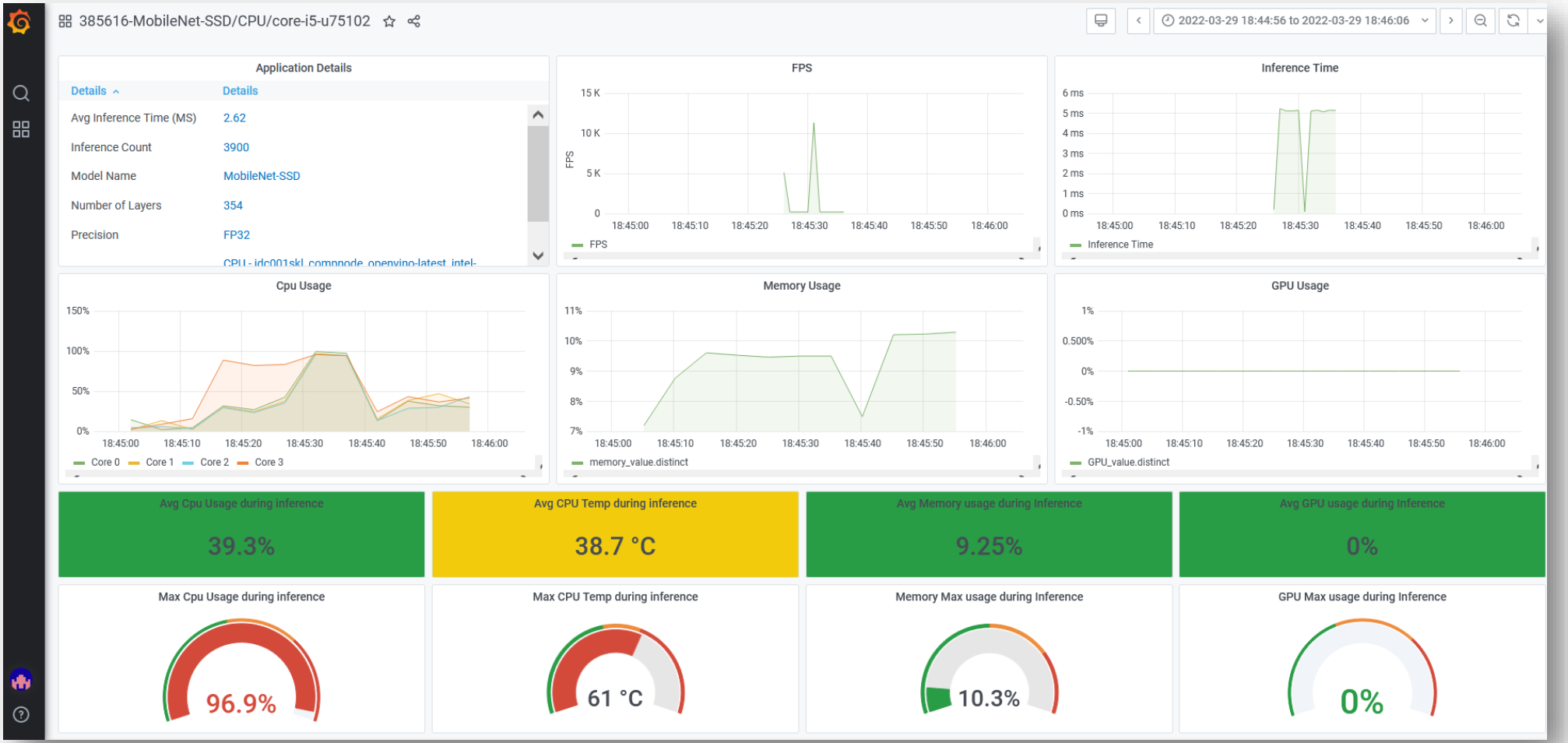


物件偵測結果比較(FPS)



物件偵測結果-Dashboard

Intel Core i5-6500TE



小結

- Intel DevCloud提供一個和Google Colab類似的開發環境，可使用Jupyter Notebook進行開發。
- 系統已預安裝好OpenVINO、OpenCV及相關套件包。
- 程式可直接在CPU下執行或以指派工作方式平行執行，並可繪製測試速度數據比較圖。
- 完成的程式易於佈署在指定硬體上。

參考文獻

- Intel DevCloud

https://devcloud.intel.com/edge/

- Intel® DevCloud for Edge | OpenVINO™ toolkit | Ep. 58

https://youtu.be/OgNnBnzIsZs

- Intel OpenVINO

https://docs.openvinotoolkit.org/latest/index.html